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Information Services Division
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Imaging Benefits the Enterprise

(The following is an excerpt from the *State of Montana Emerging Information Technology White Papers*, September 1995 and from the *Document Management/Imaging White Paper* which will be available from ISD in Spring 1996.)

What's Up With Document Management and Imaging?

Document Management is keeping track of stored documents that have been scanned into the computer or created via word processing, spreadsheet or other applications. An imaging system may be an integral part of a document management system.

Imaging refers to the online storage, retrieval and management of electronic images of documents. The main method of capturing images is by scanning paper documents.

Electronic document management systems allow users to input a document using Optical Character Recognition (OCR) software and a scanner to create a digital file of the document. This file can be archived just like paper would be saved in a file cabinet. Image management software allows the user to index the document using key words which will allow them to find it faster when it is needed. The process of inputting and saving the

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Calendar of Events

March 1:
- MOPUG, 1:00-4:00, Mitchell 13A & 13B

March 6:
- ITMG, 8:30-10:30, Metcalf 111
- Governor's Blue Ribbon Task Force, 9:00-3:00, Capitol 104

March 12:
- ITAC, 8:30-11:30, Metcalf 111

March 15:
- Governor's Blue Ribbon Task Force, 9:00-3:00, Capitol 108
- GIS Seminar, 3:00-5:00, Montana State Library Conference Room 208 *(see sidebar this page)*

March 19:
- SEC, 9:30-11:30, DPHHS Auditorium (METNET)

March 27:
- ISPG, 1:00-3:00, Montana State Library Conference Room 208

April 1-3:
- Montana GIS 1996 Conference, Holiday Inn Parkside and University of Montana Campus, Missoula *(see article on page 10)*

April 3:
- ITMG, 8:30-10:30, Metcalf 111

April 5:
- MOPUG, 1:00-4:00, Mitchell 13A & 13B

April 9:
- ITAC, 8:30-11:30, Metcalf 111

April 12:
- GIS Seminar, 12:00-1:00 Brown Bagger, Montana State Library Conference Room 208 *(see sidebar)*

April 16:
- SEC, 9:30-11:30, DPHHS Auditorium (METNET)

April 17:
- ISPG, 1:00-3:00, Montana State Library Conference Room 208

April 18:
- Term Contract Vendor Trade Show, 10:00-4:00, Helena College of Technology *(for more information, contact Brett Boutin (444-0515))*

April 26:
- GIS Seminar, 3:00-5:00, Montana State Library Conference Room 208. *(see sidebar this page)*

June 23-28:
- GPS/GIS '96 Conference, Yellowstone National Park and Billings *(see article on page 10)*

document files is as labor intensive as using the real paper but time and effort is saved in retrieving these documents. Some systems simply allow the user to input and store data while others allow users to input and store text and data and attach annotations to the saved file.

It has been 14 years since personal computer technology revolutionized the way we do business. Despite this revolution, more than 60 percent of organizations' 5.5 billion documents per year are still stored and accessed manually (i.e. in paper form).

Technology Analysis

Standards

Standards Bodies

In the Spring of 1995, two standards coalitions known as Shamrock and DEN combined to form the Document Management Alliance (DMA). The DMA will pursue the goal of defining specifications for enterprise document management library services and software for searching for and accessing documents. A major benefit of this alliance will be the proliferation of DMA-conforming products in 1996.

Shamrock and DEN had made significant progress with their respective specifications at the time of the DMA announcement. The DMA specification will build from these previous works and will focus on three key areas of technical specification: allowing users to access multiple document libraries from a single desktop, enabling application development through common access to enterprise library capabilities, and facilitating integration with legacy document systems and other OIS services such as messaging and workflow. The convergence will be a boon for new document management applications.

Montana State Standards

A committee comprised of several members of the State IT community worked to develop the document

GIS Seminars

March 15 - Michael Sweet, University of Montana, School of Forestry, *Visual Analysis: The Zen of GIS.* This session will explore new dimensions in visual reasoning and communication through the application of scientific visualization and multimedia software to geographic databases. The seminar will be held on March 15 in the Montana State Library Conference Room 208 from 3:00-5:00. For more information, contact Kris Larson (444-5691).

April 12 - Roly Redmond, University of Montana, School of Forestry, *Mapping Existing Vegetation and Land Cover Across Large Geographic Areas Using Remote Sensing and a GIS.* (Please note that this seminar has been rescheduled from February 16 to April 12.) This presentation will describe general methods and results from the GAP Analysis project in western Montana. Roly will also discuss how the findings and techniques can be applied to other projects. Please note that this presentation is scheduled for a NOON Brown Bagger. The seminar will be held on April 12 in the Montana State Library Conference Room 208 from 12:00-1:00. For more information, contact Kris Larson (444-5691).

April 26 - Stu Kirkpatrick, Butte Silver Bow Planning Department, *The Montana Local Government GIS Coalition - Have We Got a Deal For You!* Want good quality, cheap data? Sure you do! Then investigate the cost sharing possibilities of data collection with the nearest local government in your study area. The Montana Local Government GIS Coalition has been incorporated to promote state-wide database standardization and cost sharing between federal and state agencies and local governments. This seminar will describe the general mission of the Local Government GIS Coalition, examine some successful federal/state/local partnerships, and investigate the possibilities of future cost share projects. The seminar will be held on April 26 in the Montana State Library Conference Room 208 from 3:00-5:00. For more information, contact Kris Larson (444-5691).

Optical Imaging Standards and Recommendations. The document's last revision was December 16, 1992, but lacked final approval to make it an official standard. Future plans (within the next six-nine months) are to establish an ITMG subcommittee to review and update this document and to make imaging standard recommendations to ITAC.

Current Issues

Implications
Many users are discovering that once they've stored an enormous amount of paper data electronically, they face a new challenge in sorting and finding the information. "We've traded our mountains of paper for an electronic heap" is one way of putting it. While electronic storage can yield direct storage cost savings and accelerate document retrieval, it does little to increase the users' ability to access and use document content. There is too much unstructured information, and the massive growth in digital documents will severely hamper file systems if the absolute number of documents is not reduced. Search and retrieval technology is advancing and may provide some relief in extracting needed information.

An organization's strategic approach to building a document management architecture is a gamble with the organization's information assets, their nature, and the use and accessibility of them.

Vendors
The document imaging market is in the midst of a consolidation phase, where the big will get bigger and the small must grow quickly, be acquired or fail.

Which vendors will survive the document imaging marketplace consolidation? Vendors are now striving for the opportunity to be recognized as strategic, long-term providers. Their goal is to achieve enough momentum (i.e. revenues, installed base) necessary to survive the current market consolidation. Focus on the vendor viability will be especially important when beginning or renewing relationships with imaging software vendors.

Benefits
By storing documents manually, it would be difficult to say that a company is not incurring both financial and productivity losses as it drowns in a continuously rising sea of documents. Increases in productivity and reduced storage costs are only two examples of the many benefits that can be achieved. As the awareness of these benefits increase and the cost of the technology continues to decrease, imaging is quietly becoming a dominant force inside many organizations. As demand for these systems increases, so does the competition within the marketplace.

Accessibility: You'll be able to locate magazine articles, press releases, memos, and anything else—in the blink of an eye—once the material is scanned and recognized.

Storage: Paper files can take up a lot of space—space for which you pay rent. A single imaging storage cartridge can store about the same amount as a file cabinet.

Drawbacks
Setup: Getting all the documents into your system can take a long time.

Operations: Although the technology exists to have an enterprise system, defining the who, what, why, when, where, and how of implementing and maintaining a system can be a very difficult task.

Future Trends/Directions
There are several factors affecting the growth of the document management market (projected $2 billion+ by 1998):

- the growing number of client/server-enabled corporate document creation teams.
- the commoditization of "front office" image applications, forcing production imaging vendors to provide lower cost products on client/server platforms.
- the emergence of document management products that can control processes within a document's life cycle, support teams, and deal with compound documents (e.g., text, graphics, image, voice, video).

By 1998, a combination of operating system, network, and database products will inherently support these conditions.

Document imaging has few unique technologies today; instead, it shares many common technologies with traditional office computing. This was not always the case with imaging, yet the technologies (e.g., facsimile and server technologies, optical character recognition, optical storage and scanners) will become more widespread.

Current Enterprise Implementations

Livestock
The Livestock Brands System Image Project provides for the automated capture, maintenance, and retrieval of information on all brand owners and recorded brands in the state of Montana. Part I of a two part enhancement project was undertaken in the middle of 1989 with the objective to create and store an image of each of the 26,000+ unique brands and to print these brand images on various documents using the Department of Administration's laser printer. Part II of the project is to display the images when ownership information is retrieved online.

State Fund
The Fund has implemented a claims management system, in which they're scanning records from the start of FY96 forward. The system consists of an IBM RS6000 running UNIX, 40ppm scanners, FileNet Image Management System software for

scanning and indexing, and an optical jukebox capable of storing 96 platters. Each platter holds up to 7 GB of data, or 120,000 pages.

The FileNet software is extremely efficient, and State Fund recommends to others that they focus on good software rather than expensive equipment in planning an imaging system. Response time is the key feature, and the software is "smart" in that it assumes the next page that should be looked at.

State Fund's claims system is networked, and ties into their fiscal system. So far, the customers are pleased, and it appears the system is a success and will continue to provide benefits for years to come.

Public Health and Human Services
Public Health and Human Services (PHHS) is utilizing a document management system for records' storage and retrieval of personnel records. More of a pilot than a full system, the small Panasonic system consists of a scanner, printer, storage, and fax.

Justice
The Department of Justice believes that the use of imaging technology offers a cost-effective way to provide better services to the Montana law enforcement community and to the public. The Department has acted on this belief by putting into effect three key programs that serve Montana citizens.

One program is the Digitized Driver Licensing System. July 1, 1994, saw the new digital technology put to use at exam stations throughout Montana. Unlike the old procedure, the digital imaging system does not require film, photographic chemicals, or a conventional still camera. Instead, it captures images by using a computer and a video camera. The new licenses contain many tamper-proof features. In the center of the license, a hologram partially covers the portrait and demographic information, while completely covering the date of birth. When the license is tilted, the color of the hologram changes from light pink to light green. Any tampering will show in this area. Each license has a magnetic stripe on the back that contains the information found on the face of the card.

The second program is the Automated Fingerprint Identification System (AFIS). AFIS is a six-state cooperative network that captures electronic fingerprint images of individuals and stores them in a multi-state database. The system is used for a number of criminal justice purposes: checking criminal history records, updating records, searching for unidentified persons, attempting to provide positive identification in questionable cases, and matching prints from crime scenes to more than 14 million prints available through the system. AFIS has been instrumental in matching crime scene fingerprints in more than a dozen serious crimes since its inception in Montana in December 1992. As the system matures, it has tremendous potential as a tool for criminal investigations in Montana and, ultimately, for solving crimes that simply cannot be solved by relying on searches of manual records alone.

Finally, the Driver Control Section is using imaging technology to improve access to driver licensing records that are currently stored in large revolving files and retrieved manually in a time-consuming manner. More than 1.2 million records will be scanned into the imaging system. This new system will reduce the time spent searching for drivers' files, pulling and filing driver's records, answering questions, and following up on action pending.

Historical Society
Currently, Publications uses scanner technology to bring information, documents, and images into their desktop publishing system. Preservation is using a scanner to exchange information with universities, private companies, and others in working on site reviews. The Publications system will remain stand-alone, while the Preservation system will be networked.

Natural Resource Information Systems
Natural Resource Information Systems (NRIS) incorporates scanned photographic images of plants, animals, and habitat into the GIS application on PC/UNIX workstations.

Transportation
Several imaging applications, from low-end to high-tech, are in use by Montana Department of Transportation (MDT). On the low end, hand held scanners are in use by the Motor Fuels Division. Large scale 'D' size construction plans and other large documents are scanned at the Mapping Division. For a high-tech application, aerial photography is scanned into the CAD system.

MDT utilizes scanning software called PhotoScanner, which digitizes photos and ties into layers in the CAD system, such as traffic, road design, bridges, signs, etc. The application is networked, and follows a document management flow. The design phase starts at traffic, then to design, on to right-of-way, and finally safety. From design it goes to contract planning, who look at it electronically. After their approval, it's off to duplication services. This system will potentially tie in with the Contractor's Association, where MDT can send them bid lists and they can maintain a bid list of contractors.

Future Enterprise Plans

Several agencies are interested in imaging/document management systems in the future. The interest level ranges from general curiosity to definite budgeted plans.

Administration/Teachers Retirement System
Teacher's Retirement System (TRS) has numerous personnel records that need to be filed. Besides a tremendous backlog, the division has a steady inflow of documents. TRS cannot

afford the type of system it would require to scan and store their volume of documents. The best case scenario for them and other small agencies would be to implement a statewide imaging/document management system. It has been suggested that ISD implement and house this system, and have a charge back mechanism for providing this service. This will be evaluated for the coming biennium.

Legislative Branch
A potential use of imaging is to electronically store exhibits at the library. Exhibits are backup documents for individuals testifying in committee meetings.

Document management has potential to streamline the process of retrieving text files related to laws. The Branch has looked into SGML (Standard Generalized Markup Language) as a means to retrieve text files related to laws. Some SGML products have workflow options that potentially could be utilized to follow the bill process through various workgroups.

Natural Resources and Conservation
Water Rights is investigating using imaging technology for water rights application forms. Oil and Gas might also look to imaging use on forms for bonds, wells, etc.

Revenue
A small pilot application is underway for imaging tax payments in Revenue's cashiering system. It is a stand-alone application, and they do not foresee this being widely used in the future. Electronic Data Interchange will most likely be used for direct payments, and imaging will not be necessary.

Secretary of State
After the Business Process Reengineering effort is complete, Secretary of State (SOS) will have a good idea of what they need to do concerning imaging. They may wait until there is state direction in place before proceeding with any projects. The Records Storage division can greatly benefit from an imaging system.

State Auditor
This office generates vast amounts of paper for licensing applications and registrations. If funds permit, the State Auditor will use imaging/document management technology to streamline these processes.

Judiciary
At the end of the current biennium, the Judiciary Branch plans to implement an imaging application to be used primarily for indexing court records.

Justice
Within the next two years, the Department of Justice intends to help set general imaging standards and to pursue one or more large imaging projects that would enhance its ability to provide cost-effective services to the public and the law enforcement community. The department intends to:

- Examine the use of imaging technology for storing, indexing and retrieving legal and investigative documents. It is believed that imaging has significant potential in managing the huge volumes of documents that are characteristic of some legal cases in which the Attorney General's Office defends the State of Montana and for investigation and prosecution of cases involving Workers Compensation and Medicaid fraud money laundering, and other matters that have high volumes of documents and evidence.
- Implement state and national upgrades that will enable the Criminal Justice Information Network (CJIN) system to transmit images (such as mug shots and pictures of crime scenes or stolen property) and to relate those images to other information that law enforcement officials may need.

How Other States Are Utilizing This Technology

Delaware—Business System Master Plan Initiative, Division of Revenue
This total reengineering effort redesigned the entire systems infrastructure of the Delaware Division of Revenue. These integrated revenue systems combine mainframe, client/server and document imaging technologies to streamline operations, eradicate redundancy and map current and future processing requirements. The result has been a 50% increase in baseline tax enforcement revenues and unparalleled levels of tax payer service.

Kentucky Labor Cabinet Imaging System—Labor Cabinet Kentucky
Beginning January 1, 1995, the Kentucky Labor Cabinet began production of an imaging system to integrate and automate the workers' compensation claims processing. The Imaging System configuration currently consists of a departmental processor, seven scan stations, two jukeboxes, 130 individual workstations, and assorted software. The Cabinet anticipates scanning over one million documents each year involving claims processing.

The imaging system sidesteps the physical boundaries of multiple locations via T-1 communication lines on the Commonwealth Integrated Network System, thus alleviating the duplication of existing claim files. They plan to extend the imaging system to include remote offices.

During a study of the manual process, it was determined that workflow management must be implemented in order for the Cabinet to meet its goals. The system allows staff to manage the flow of electronic documents through the Cabinet in a faster and more efficient manner to get the claim processed. Simultaneous access to a case file is available to individuals in different areas which eliminates the substantial time previously spent

waiting for access to the hardcopy file.

The Cabinet has already experienced a reduction in staff time and manpower savings due to a reduction of misfilings and associated errors. Although the system has not been implemented long enough to conduct benchmarks to substantiate cost savings, the Cabinet expects to reduce claims processing and related costs by approximately $5.5 million per year.

Brett Boutin
Information Systems Specialist
Computing Policy and Development

Mainframe Based Graphics and Imaging Is Available

ISD has IBM's GDDM (Graphical Data Display Manager) installed on the mainframe. There are several pieces to GDDM. They consist of GDDM/MVS, GDDM-IVU, and GDDM-PGF. The following is a brief explanation as to what each of these pieces can do for you:

GDDM/MVS

This is what IBM calls the base program for GDDM. This base program provides the application programming interface which provides a large set of calls that allow manipulation of graphics, images and alphanumerics. The calls also provide many other types of function including support for run-time mapping and I/O support for many display and printing devices.

Other functions in the base GDDM program include:

- *Image Symbol Editor:* This is used for creating and editing symbols such as company logos, shading patterns, alphanumeric characters and marker symbols for charts.
- *User Control Facility:* This provides a set of commonly required application functions for users of display terminals (viewing only functions): panning and zooming of graphics and images; printing, plotting and saving of screen contents; and scrolling, sizing and positioning of operator windows.
- *GDDM-PCLK:* This is an IBM PC program that enables you to display graphics generated by a GDDM program running on a host computer linked to PCs equipped with a graphics display adapter. This piece is not used much and has since been replaced with other HOST graphics software such as Attachmate's EXTRA HOST GRAPHICS OPTION, etc.

GDDM-IVU

Graphical Data Display Manager - Image View Utility is a program that is run from a terminal to:

- Create images by scanning documents
- Save images in disk files
- View images on the terminal display screen
- Edit images in various ways such as altering their size or merging multiple images
- Create image output files for printers

GDDM-IVU has an API (application programming interface) in which programmers can call GDDM-IVU from other programs and they can customize it which enables them to add image capabilities to existing applications.

GDDM-PGF

Graphical Data Display Manager - Presentation Graphics Facility is comprised of :

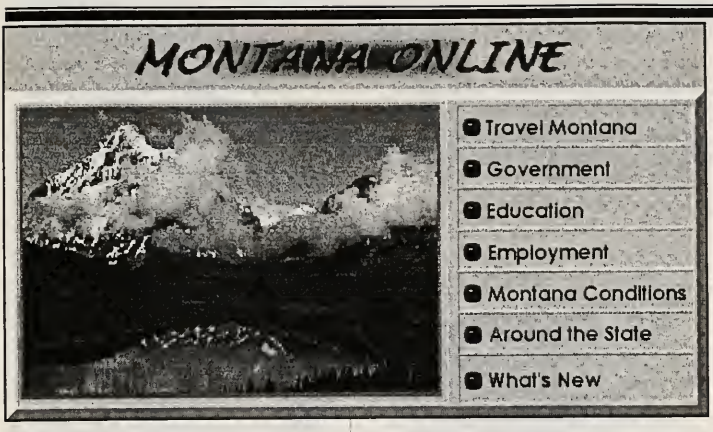
- The Interactive Chart Utility (ICU) which can produce Line Graphs, Plots, Charts (pie, bar, polar, tower, table and text only), and Histograms, etc.
- Vector Symbol Editor which provides the same function as the Image Symbol Editor but for vector symbols.
- Application Programming Interface offers the programmer two methods of drawing charts: the ICU can be called from an application program, or a set of presentation graphics (PG) routines is provided for the creation and display of charts. The PG routines allow application programs to supply data to ICU and to control the chart types and layout.

The Department of Livestock uses GDDM to create their 10,000+ brands. They use a utility within GDDM to convert their PIF files to a graphical format that can be used by GDDM. They also use various other software (CICS, PSF, AFP) along with GDDM to print, and display these graphical brands at their remote offices.

SUMMITNET

SummitNet Begins Its Expansion

Work has begun on the SummitNet expansion. Routers are being ordered for Spring installations. ISD has issued an Invitation for Bid (IFB) for T-1 circuits to connect the cities of Helena, Bozeman, Billings and Missoula. Once this "core" is in place, agencies can begin to be connected. A migration plan is being developed that will probably take a city-by-city approach. There should be minimal changes for users at the local sites.



Montana Online Debuts!

Montana Online welcomes you to the Big Sky Country! *Montana Online* (the newly revamped State of Montana home page) made its debut on the World Wide Web on February 12, 1996.

The goals of *Montana Online* are to make Montana government and education information accessible via the Internet, to stimulate the growth of state agency World Wide Web services, and to serve as the *front door* to the **State and Universities of Montana Multiprotocol Network (SummitNet)** and other Montana information resources. Anyone attached to the Internet will be able to access information from a variety of state agencies, federal agencies, other citizens of Montana (or citizens of the world for that matter), commercial vendors, and the Montana University System (as well as any other University in the world that is on the Internet).

You can discover recreation and adventure, events and attractions, and MORE about the Big Sky by taking a vacation to **Travel Montana**. A short trip to **Government** will allow you to access State agencies and local governmental information. Touring to **Education** will allow you to visit State Universities, Tribal Colleges, K-12 and the Office of Public Instruction, libraries, and other educational related resources. You can use the Internet Self Directed Job Search System provided by the Montana Job Service to find job opportunities in Montana by taking an excursion to **Employment**. A detour to **Montana Conditions** will allow you to glance at current weather conditions, road reports, and forecasts. A quick journey **Around the State** will allow you to easily explore other Montana sites on the Internet. And don't miss Special Announcements, New Services and Other highlights from *Montana Online* by taking a jaunt to **What's New**.

Who's stopping by?

ISD has been keeping statistics from its World Wide Web Server which has been up and running for over a year. Here is a look at some very interesting statistics from activity occurring on the Web Server.

The State of Montana home page took a total number of 222,703 hits with 23,369 user sessions during a recent 3½ month period from mid-October 1995 to January 1996! Most of these sessions originated from within the United States but almost 3% originated from international sessions. During this period, the home page averaged 2,081 hits and 218 user sessions per day. Currently, the home page averages over 5000 hits and over 300 user sessions per day. Not surprisingly, the page which saw the most activity was the home page with almost 59% of the total number of hits, with the **Government** page receiving almost 13%, and the **Education** page getting 11% of the hits.

The most active organization accessing Montana's home page was, again not surprisingly, Montana State Government with 22% of the hits. Other organizations accessing the home page, in order starting with the most hits, were America Online (10%), Montana Communications Network out of Billings (5.5%), the University System, Prodigy, Compuserve, Internet Montana from Billings, and Uunet Technologies.

Most of the sessions (97%) were

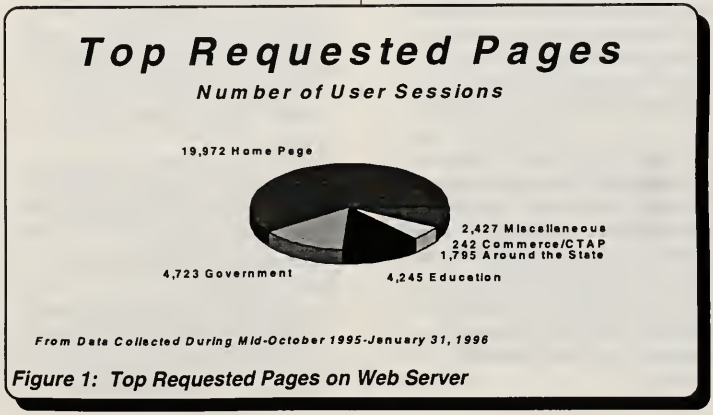


Figure 1: Top Requested Pages on Web Server

coming from the United States, but one percent were coming from Canada. Hits originating from Japan came to a total of 63 during this 3½ month period. Other foreign sites accessing our home page were United Kingdom (55 hits), Sweden (41 hits), Australia (38 hits), Germany (45 hits), Netherlands (23 hits), Norway (19 hits), Finland (19 hits), Italy (30 hits), Denmark (8 hits), France (8 hits), Austria (7 hits), and Spain (4 hits). Interestingly enough, during the first seven days of February 1995, our home page received visits from Hong Kong, Switzerland, Iceland, Morocco, Hungary, and Mexico in addition to the other countries listed above. Montana IS on the World Wide Web and other countries ARE taking note!

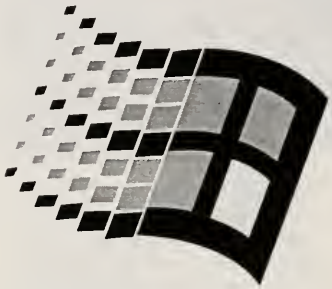
Almost 1.2 GB of information has been downloaded from the Web Server during this 3½ month period in the form of text files, compressed files, and graphics, among others.

The breakdown of sites visiting the home page by state follows. Most sessions originated from Montana (State Government, Montana Communications Network, Universities, and Internet Montana). Virginia (the home of America Online and Uunet Technologies) was second, followed by California, New York (home of Prodigy), Ohio (home of Compuserve), Washington, Texas, Pennsylvania, and Colorado.

These are just some of the highlights from the statistics gathered from the Web Server. Future articles in *ISD News & Views* will keep you informed about *Montana Online*, current statistics, and major enhancements.

The work that has been done thus far has successfully linked the State of Montana to the Internet, providing the world with valuable information about the State of Montana. It has also made an exploratory beginning at creating a common repository of information available to state government personnel as well as citizens of Montana.

You can visit *Montana Online* by taking a journey to **http://www.mt.gov**. Enjoy your stay and come back soon! If you have questions regarding *Montana Online*, please contact Ed Conrad (444-2866) from End User Systems Support.



Testing of Windows 95 / NT Has Slowed Down

The Desktop OS/Network OS subcommittee of the ITMG has a working group evaluating Windows 95 and Windows NT. It is made up of members from multiple agencies and is charged with determining the viability of using Windows 95 and/or Windows NT workstation as a desktop operating system within the statewide enterprise.

Testing and possible implementation of Windows 95/NT as a State standard has now been slowed down considerably, due to several factors.

- There are real concerns over the network security abilities (or lack thereof) in 95.
- The shortage of additional resources and manpower within ISD, at this time, to continue testing at the level of the last few months.
- The network sharable NDS code does not yet work.
- The 95 Palindrome (backup) code is not expected until mid-March and must be successfully tested before a roll out of 95 can be considered.
- There have been, to date, only minimal requests from state agencies to replace Windows 3.1 at this time.

Testing and problem solving will continue, but **a decision on the use of Windows 95/NT is not expected for several months.**

Please be reminded that Windows 95 and Windows NT Workstation are not yet accepted as State standard software. Central Stores and all agencies have been asked by the ITMG not to allow purchase or installation of Windows 95 or Windows NT Workstation on State computers. For those agencies receiving new PCs with Windows 95 or NT already loaded, you must remove 95 or NT from the PC, and load Windows 3.1x instead. (Microsoft allows receiving 95 on a new machine, and then using an older Windows version instead. This would relieve agencies from having to buy a new Windows 95/NT license later when a decision has been made on supporting the new Windows). While it is generally agreed that Windows 95 is a capable platform for home use, there are questions to be answered yet about how 95 or NT workstation will perform within and affect the State's computer enterprise. We will keep you informed of the progress and findings of this group in monthly *ISD News and Views* articles. If you want further information, contact Denny Knapp (444-2072 or via ZIP!Mail) of End User Systems Support.

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ISD Supports Lotus Approach

R:BASE Support To Be Eliminated

ITMG has accepted the Enterprise Software Committee's recommendation that the supported Windows end user database product be Lotus Approach. Approach has outstanding features in:

- integration with Lotus spreadsheets
- superior data retrieval
- support of numerous database formats and connections including ORACLE, DBF, ODBC and many others
- ease of use for the end user
- a macro-based programming structure
- easy-to-use and easy-to-create forms, reports and mailing labels

Approach network users can share databases, Read Only and Read Write passwords can be established and joined tables and relational structures can be created.

Oracle is the enterprise database standard. Your management will decide whether Oracle or Approach is the best product for the application you are developing. Approach is designed with the end user in mind. It should most often be used for personal, or small applications, data queries and other basic database usages. Approach may be used by Lotus 1-2-3 users who have gone beyond the data handling capabilities of 1-2-3.

R:BASE 3.1, the DOS database standard, has been moved to the sunset list and all support for R:BASE will terminate on January 1, 1998. Approach is able to import your R:BASE data from an exported R:BASE DBF file. Your applications will not import. Approach does most of the same functions, without any coded application development, where coded applications were required in R:BASE. ISD highly recommends those who use DOS and DOS databases to plan and budget for a move to the Windows environment by the end of 1997.
Lotus Approach requires a minimum of 6 MB and a 386 running Windows 3.x. The performance on a 386 is sluggish, but no more than that of other Windows products. A 486 or better class machine, with 8 to 16 MB of RAM is preferred.

"ITMG has accepted the recommendation that the supported Windows end user database product be Lotus Approach.

Oracle is the enterprise database standard.

R:BASE 3.1 has been moved to the sunset list and all support for R:BASE will terminate on January 1, 1998."

Approach is available from Central Stores. The retail cost per copy for the Full Package is $105.56 and the License Only is $96.25. The license package does not include manuals or the free 30 days of support.

Approach is fully supported by ISD, and the Helena College of Technology will be offering one day classes on April 22 and 29. Approach articles will appear periodically in *ISD News & Views*. If you have any questions concerning Approach, contact Brian Divine (444-2791) from End User Systems Support.

This Is A Test!

Disaster Recovery Rehearsal Is Scheduled

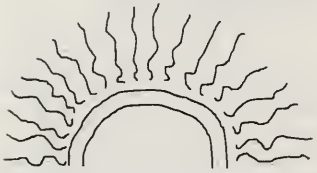
ISD has scheduled the 1996 Disaster Recovery Rehearsal for May 3-5. The purpose of this annual disaster recovery drill is to test the State of Montana's ability to recover critical information processing systems. Three previous drills have been conducted with the latest being completed on November 10-11, 1994. These disaster recovery tests have successfully recovered the Department of Administration's data center, the statewide telecommunications network, numerous agency application systems, and related infrastructure.

This year's drill will focus on the following critical recovery elements:

- recovery of the Department of Administration's data center;
- recovery of selected portions of the statewide telecommunications network;
- recovery of the Department of Correction's AS400 platform and associated application systems;
- recovery of the Department of Public Health and Human Service's SEARCHS application system and its associated network;
- recovery of the Department of Administration's payroll and SBAS applications;
- recovery of ISD's Telco and associated billing systems;
- recovery of the Department of Justice's criminal justice system;
- recovery of several of Department of Fish, Wildlife & Park's application systems.

As a followup to this year's drill, ISD staff will begin working with all state agencies to begin the development of business continuity plans. The focus of these plans will be the recovery of all agency infrastructure necessary to restore critical agency business functions.

For more information, please contact Bob Cummings (444-2469) from Computing Policy & Development.



Montana GIS 1996 Conference

"Sharing Information—From Local to Global"

The theme for this year's conference involves sharing information, data, and techniques on geographic scales ranging from local neighborhood to global networks. The conference will be highlighting collaborative projects and efforts to cross organizational and disciplinary and geographic boundaries. Education, through formal classroom settings and through self-paced learning on the Internet World Wide Web is a primary focus of efforts this year. As always, the conference will bring you dozens of innovative applications in natural resources, local government, and special topics. The presentations filled faster this year than we've seen in the entire history of the Montana GIS User's Group. Something is up with GIS in Montana and the Northern Rockies. You'd better come and find out what it is!

The eighth annual conference is sponsored by the Montana GIS User's Group, a statewide consortium of governmental agencies, universities, and businesses involved with GIS technology. Up to date schedules and information can be found on the conference home page on the Internet at **http://www.forestry.umt.edu/mtgis.**

Conference Highlights

Pre-Conference Workshops

Participants can select from eleven workshops that focus on special topics of interest to GIS novices, specialists, and managers.

Special Attractions

Welcoming and keynote by Nancy Tosta, director of the Federal Government Data Committee and plenary talks by authors Dan Kemmis, Bill Huxold, John Steffenson.

Concurrent Sessions

Participants can select from three concurrent tracks—natural resources, local government and applications and special topics—designed to focus on different types of GIS applications.

Poster and Exhibits

Major U.S. and Canadian vendors of GIS and GPS software, hardware, and services will host exhibits during the conference. Posters and exhibits by GIS users from around the Northern Rockies will be on display. The conference will be open to the general public, Monday evening, April 1.

For More Information...

The conference will be held at the Holiday Inn Parkside and the University of Montana Campus in Missoula on April 1 through April 3, 1996. For more information on program content or a registration form, contact Mike Sweet (243-5265 or via the Internet at **mtgis@calamity.forestry.umt.edu).**

GPS/GIS '96 Conference

"Mapping to Manage"

GPS/GIS Technology's New Role

GPS/GIS is emerging as a driving technology in meeting the changing needs of today's organization. The theme of GPS/GIS '96, "*Mapping to Manage*" reflects the evolution of GPS/GIS from a field proven data integration technology to a core organizational management tool.

Issues regarding cost effectiveness, data integrity, and rapid decision-making will be addressed during this important week of activities. GPS/GIS '96 provides a unique and timely forum for organizations approaching implementation or managing important mapping programs using this powerful technology.

GPS/GIS '96 is an in-depth, technically focused conference. Each year the GPS/GIS Conference wins high acclaim for its exceptional quality and content. GPS/GIS '96 continues this tradition by providing in-depth technical seminars, hands-on GPS/GIS workshops, and field mapping trips designed to offer managers, technical professionals, public officials and field researchers a focused setting to meet and discuss important issues.

Conference Highlights

The Information You Need...First Hand

GPS/GIS '96 offers the opportunity to learn first hand from successful project managers during both formal and informal discussions. Interact with top industry leaders, focus on *your* projects specific needs, and find practical solutions.

Experience the Big Sky Country

GPS/GIS '96 will convene in one of the world's most beautiful and natural environments... Yellowstone National Park and Billings, Montana. You are invited to experience the breathtaking beauty of Montana's pristine vistas, the wonder of golden-hued cliffs headed by Yellowstone's thunderous waterfall, and unsurpassed wildlife viewing.

Little Bighorn Battlefield GPS/GIS Workshop

Retrace the 7th Cavalry's march to the site of Custer's Last Stand for this GPS/GIS Field Mapping Workshop. Join leading battlefield experts and military geographers for an in-depth tour and discussion of one of America's most important historical events. Learn how GPS/GIS mapping is used to enhance archeological projects and receive hands-on instruction utilizing GPS/GIS field data collection tools as we field map this historic site.

GPS/GIS Basic Training

Designed to provide introductory level instruction concerning the principles of GPS/GIS mapping, this one-day basic training will emphasize the following important issues:

- GPS/GIS Technology - Implementing a system suitable to your project needs.
- Defining your project requirements - mapping accuracies, data standards, quality assurance, differential correction.
- System start-up and management for maximum efficiency.
- Pre-mission planning for quality assurance.

Yellowstone Park Training & Field Mapping Expedition

Join GPS/GIS for an unforgettable mapping field trip to the world's first national park. Hands-on GPS/GIS field data collection exercises and discussions led by senior GPS/GIS instructors will include:

- Mission planning, database design, GIS translation, metadata standards and QA program implementation.
- Use of existing digital data in the field, data collections protocol, digital photo and video attributing, integrated use of external sensors with GPS.
- Integrating GPS/GIS into your organization to increase competitiveness.

For More Information...

The conference will be held in Yellowstone National Park and Billings on June 23 through June 28, 1996. For more information, contact GPS/GIS '96, PO Box 220, Cabin John/Bethesda, MD 20218 (800/436-5465).

Meridian Mail Tips

Recording Your Personal Verification, Express Messaging, & Greetings

Here are some more tips and important information regarding the use of your voice mail.

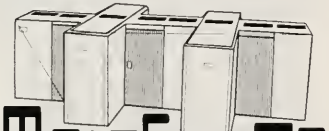
Running a 'Find Users' report gives us important information other than verifying that our listing of users is correct. It also informs us of who has and has not recorded their personal verification. This is very important for fellow voice mail users. It enables them to receive as much information as possible before they begin listening to the message you have left them. Since we are all extremely busy it is just one more way we can make their life a little easier. To refresh your memory on **how to record your Personal Verification** you would log on as if to retrieve your voice mail messages but instead you would **press 89, press 5, speak your name and if possible your extension number followed by a # sign.** Then simply log off. You never have to do it again unless you are planning to change your name.

Another useful command that some of the original voice mail users may have forgotten about is **Express Messaging.** Express Messaging allows you to leave a message on someone else's voice mail without talking to them personally. Maybe you are working during the lunch hour or after hours and you know the person isn't there. Simply **press 1889, the person's extension number followed by a # sign.** You will then hear the person speaking their personal verification (assuming they have recorded one) and then the meridian mail lady will say, "Please leave a message after the tone." Speak your message and hang up. The person's phone will not ring but they will have a fast beep or a blinking light indicating they have a message. You can also use this from outside locations—simply press 444-1889.

Here is the last tidbit. Last, but by no means least, please remember that you must include in your greeting the sentence, "If you would like to speak with someone immediately, press '0'."

Again, a reminder that voice mail classes are ongoing weekly. If you

would like to attend give us a call. We can always squeeze another person in. They are great for refresher courses too. Call Clara Baer (444-2455) or Rita O'Neil (444-6846) from Voice Operations.



Disappearance of 3380K DASD

By the time you read this article, the Computing Operations Bureau will have removed the last of the 3380K DASD. This will save $1430 a month on the IBM maintenance bill. The original 3380K (triple density) DASD was installed in November 1988. As of January 1996, there was a total of 37.8 gigabytes of data on the 3380Ks. This much DASD used 47 square feet of floor space. Correspondingly, two units of the 3390 mod-3 DASD uses 12 square feet of floor space and stores 45.4 gigabytes of information. Quite a smaller footprint with a larger capacity!

Frances Greene has already contacted users about where their data was moved. As a reminder, verify that your JCL does not use 'UNIT=3380' when allocating a dataset. Also check your VSAM DEFINE parameter for 3380 use.

For more information, please contact Robin Anlian (444-2898) from Operating System Support.

Check Out RDS!

Report Distribution System

An Overview On How It Can Help You

In recent months, we have included a few articles in *ISD News & Views* concerning the acquisition and implementation of the INFOPAC-RDS automated report distribution system. We now have in excess of 170 reports defined to the system, with more than 170 users now authorized to view one or more of these reports and these numbers are climbing steadily. We are happy to say the product meets our expectations and is being well received by its users. One application of particular significance is a group of reports produced by the Department of Administration's Personnel Division. This application has a far reaching effect because these reports are used by numerous agencies, exposing personnel from those agencies to using RDS. Perhaps you, too, have thought about processing your reports through RDS but have been too busy to find out more about it. Or, perhaps you still question whether it would provide a significant improvement over your current method of report distribution and don't want to invest the time to make a change. Let's take a closer look at the basics of RDS, what advantages it has to offer, and what's required for you to use it for your report distribution.

The administrative setup process for RDS consists of three basic steps. The first step is defining the users (or recipients, as RDS refers to them) who are to be authorized to receive hard copy reports or view reports online. Once a recipient has been defined, they need not be defined again should they later be authorized to receive or view additional reports. The only requirement for a user to be defined as a recipient is that the user must have a valid Logon ID. The second step is to define the reports themselves. And, third, a distribution scheme is created by the addition of "copy requests" or authorizations, defining to RDS which reports or sections of reports are to be provided to which recipients.

Once this setup process has been completed, we're ready for reports to be processed. Reports are written to the JES output queue (to a special output class). An RDS "sweep" job is run to retrieve those reports defined to RDS, and rewrite them in a compressed format. It is also possible to process reports directly from a tape or disk data set which is in print format. This makes the reports available for viewing online and for hard copy distribution. This sweep process is currently run several times daily and will become more frequent as more reports are added to the system. Also, a migration (or archival) process is run daily. This is a batch job which copies all reports captured that day to tape and deletes from disk all those reports which have expired.

Now let's briefly examine the enhancements RDS can provide over traditional methods of report distribution, starting with enhancements to hard copy report distribution. First, we can packet reports for users who continue to receive printed reports. Packeting is the bundling of one or more reports which are printed on the same type of paper and are being sent to the same user. Secondly, we can index these reports giving us the ability to send specific sections of a report directly to specific individuals (as long as they have a pick up box at ISD) based upon fields the user chooses to index on. This relieves the user of having to perform this task manually. We can also customize a report for different users. For example a report could be printed on one type of paper for one

user, printed on a different type of paper for another user, and perhaps, a third user desires only to view the report online. Also, users may choose to have copies of their reports printed at their remote site. And finally, using RDS, reports can be archived to tape for a specified period. Therefore, should any report being managed by RDS be lost or destroyed before its expiration date, it can be reprinted without re-running the job.

For users of computer output microfiche (COM), RDS does not change the appearance of the fiche or the manner in which they are viewed. However, RDS does have advantages to offer the COM user. Processing your COM reports through RDS provides the same backup capability as that for other reports. That is, should your COM output be lost or destroyed, it may be reproduced without re-running the application job. Also, RDS provides availability to your reports through online viewing immediately as opposed to having to wait for the fiche to be produced. RDS also provides the ability to print selected pages of a report from its online viewing menu. This may be more convenient than printing pages using your microfiche reader/printer. In fact, you may be able to reduce the number of fiche masters and/or duplicates by providing online viewing of reports through RDS. Read on!

Let's get to the good stuff. Online viewing of a report through CICS or directly through VTAM provides many capabilities. Similar to hard copy, reports can be indexed so that recipients can be set up to only view the section(s) of the report which the owner of the report authorizes them to view. In addition, a recipient can be given a reformatted view of a report, even preventing him or her from seeing specific columns of the report, if so desired. When viewing a report, there are numerous functions available. You can easily scroll through the report, freeze columns or rows, define your own view of the report, search for text strings, locate specific sections of the report, and scan a report for lines meeting specified arithmetic or Boolean criteria, among others. And when you are viewing a report and find that you would like to have a portion or all of the report printed, you may execute the print function from the viewing menu.

Oh, so you like working in a Windows environment? RDS has something for you, too. INFOPAC-RDS for Windows offers users a Windows interface for the viewing of mainframe reports. It offers many of the same capabilities offered by the 3270 version of online viewing except, of course, it works in Windows, complete with pull down menus, online help, etc. And there are some additional capabilities not offered by 3270 viewing. First and foremost, you **must** have INFOPAC-RDS for Windows to view a report of a graphical nature such as your laser reports with overlays. In addition, you can export data from your mainframe reports to your other Windows applications. There are several ways of doing this and it can be quite simple or quite complex but some users will find this to be a very useful feature. One other neat feature of INFOPAC-RDS for Windows is the ability to use scripts to perform the same set of instructions repeatedly. And finally, if you need to print a portion of or an entire report from this Windows interface, you can print to your local Windows printer.

How much is all of this going to cost? It all boils down to how much paper you're willing to do without. There is **no charge** for viewing your reports online. And there is **no charge** for storing your reports on DASD up to 30 days. After 30 days, you will be charged the regular DASD charge (based upon the size of the report dataset). RDS compresses the report files on disk, so this charge is less than if you were to store a fixed block report file. INFOPAC-RDS for Windows is **FREE**! Again, you will **not be charged** for viewing your reports. The data transferred from the MVS server to your workstation is already covered in your monthly network charge.

Hopefully, this provides a general overview of how INFOPAC-RDS operates and some of the features it offers, but by no means does it tell the whole story. I also promised to include instructions for getting started using the product. That's the easy part. Simply pick up your phone and call Dave Smith (444-2857) or Jan Lewis (444-2901) from Security, Methods & Media Management. They will be happy to provide you with additional information, arrange a demonstration, provide additional training for current users, and start getting your reports set up.

Which Class Do I Use?

Mainframe Job Classes Are Specified

This article will refresh users' memories on what the mainframe job classes are and how they are billed.

1. Authorization is required to use a **Scheduled Production** job class. Please call Mike Krings (444-1815) for information on authorizing a job for scheduled production.

	Scheduled Production	Prime Shift	Second Shift	Discount	Concurrent Tape Usage
Processing Rates	110%	100%	67%	65%	
Classes	6	A	V	Q	1
	7	B	W	R	2
	8	C	X	S	3
	9	D	Y	T	4
		E	Z		0
		H			1
		F		N	5

Figure 2: Mainframe Job Classes and Processing Rates

2. **Scheduled Production** and **Prime Shift** jobs are processed 24 hours a day, seven days a week.

3. **Second Shift** and **Discount** jobs are run between 5:30 pm and 8:00 am, Monday through Friday, and all day on weekends and holidays.

4. **Second Shift** job classes are intended for users who are actually working during second shift or on weekends or holidays. These classes are meant to provide good turnaround at a substantial discount for users who work outside of prime shift.

   Please use a **Discount** job class if you do not need your job until the next workday. You will receive a larger discount and will not impact those working during second shift.

5. **Concurrent Tape Usage** indicates the maximum number of tapes that can be concurrently mounted in any step of a job in this class.

6. **Class H** jobs are limited to 5 seconds of CPU time and cannot use a priority. This class is for quick jobs that require fast turnaround. The processing rate is 110%.

7. **Class E** jobs are limited to 30 minutes of wall time and no operator intervention. This means there can be no tape mounts or messages issued to the console that need a response.

8. A **priority** may be assigned to a job to improve its turnaround. The processing rate will be increased if a priority is used. The rate will be computed by taking the normal processing rate for the class used and increasing it by a percentage equal to ten times the priority used. Class H jobs may not use a priority. See Figure 3 for examples of processing rates with priorities.

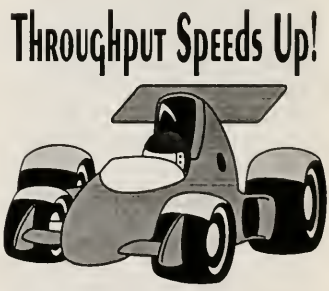
Examples:
Rate = Normal Rate × (1 + Priority × 10%)
Class B, Priority 5: 150% = 100 × (1 + 5 × .10)
Class X, Priority 2: 80% = 67 × (1 + 2 × .10)

Figure 3: Examples of Processing Rates with Priorities

9. Job classes are processed from left to right according to the table shown in Figure 2. For example, a job in a Prime Shift class will be executed ahead of all jobs in the Second Shift and Discount classes. Likewise, a job in a Second Shift class will execute ahead of all jobs in the Discount classes.

10. Users with jobs that require more resources than the above job classes provide or that require special attention should contact the ISD Computing Operations Bureau (444-1815).

If you have any questions about Mainframe Job Classes, please contact Robin Anlian (444-2898) from Operating System Support.



Mainframe Connection Via TCP/IP Vastly Improved

The TCP/IP connection for the State mainframe in the Mitchell building recently received a major throughput enhancement. A mainframe data channel was connected directly to a Cisco/7000 router. The mainframe channel is capable of transferring 17 million bytes per second and the Cisco/7000 router can handle many times that amount. Depending on many factors, such as the speed of the

underlying transport medium, (LAN, WAN, etc.) and the type of remote workstation, remote throughput will be less than the 17 million value quoted above.

During testing on this new connection, throughput was about four times as fast as the old connection, using FTP file transfers between the mainframe and LAN-attached PCs. The configuration for these tests was a four million bits per second token ring LAN traversing a couple of routers to a 16 million bits per second token ring LAN, then to the Cisco/7000 and mainframe channel. Throughput went from about 20,000 bytes per second to 90,000 bytes per second. At 90,000 bytes per second we were using about 18% of the four million bits per second LAN, and the routers and the mainframe had negligible utilization. In this configuration it appears that 90,000 bytes per second is about the maximum throughput that can be directed between the mainframe and a PC on the LAN.

Other LAN technologies such as FDDI, Ethernet LANs at 100,000,000 bits per second, Frame Relay, or ATM WANs could potentially reach 10 to 12 million bytes per second, however, throughput of that magnitude is not available at this time.

Currently, the mainframe offers TELNET, TN3270, FTP, and RDS applications via TCP/IP. If you would like to connect to the mainframe via TCP/IP contact Craig Smith (444-3458) from Operating System Support.

"At the February meeting of the ITMG, the Enterprise Software Subcommittee put forth a recommendation that the state adopt Lotus Approach as its end user database. The subcommittee's recommendation was approved. For more information on the Lotus Approach product, see the article on page 9. The Helena College of Technology will begin offering training on Approach in April."

ITMG Approves New Database Standard

At the February meeting of the Information Technology Managers Group (ITMG), the Enterprise Software Subcommittee put forth a recommendation that the state adopt Lotus Approach as its end user database. The subcommittee's recommendation was approved by the membership. Thanks to the subcommittee for their hard work on a complex issue. For more information on the Lotus Approach product, see the article on page 9. The Helena College of Technology will begin offering training on Approach in April. For complete class schedules, see the Training Calendar on page 22.

The Operating System and E-Mail Subcommittee continues its work with Windows 95 and Windows NT. There are still unresolved issues with Windows 95 and NetWare and ISD support. For more information on Windows 95 and NT, see the article on page 8.

The Oracle Managers Group made a recommendation for enterprise adoption of the Oracle 2000 toolset as the state standard. The recommendation contained four pieces: 1) A single strategy for an Oracle toolset; 2) Enterprise licensing and management of Oracle 2000 software; 3) Enterprise sponsored education for the new standard; 4) Agency commitment to the enterprise standard. A fifth piece was added to 5) Cover existing Powersoft tool users under a grandfather clause.

ITMG voted to approve the recommendations and they will go to ITAC (Information Technology Advisory Council) in March.

Full minutes of the meeting may be found on the state BBS (Agency / Administration / Advisory Groups), on the Value Added Server (under GUEST\ITMGINFO), or by calling Amanda Christen (444-2700) from Customer Relations.

Getting WordPerfect 6.1 Online Help Quickly

When you need help quickly, WordPerfect's Online Help is the best solution for information at the click of a mouse. Last month, we talked about the **"Search for Help on..."** feature from the Online Help section in WordPerfect 6.1 for Windows. Suppose you have just gotten WordPerfect 6.1 installed on your PC and you need a step by step instruction on how to do a word processing task. You should investigate the **"How Do I..."** section of Online Help. It is sensibly organized into books, chapters and finally pages of information relating to similar tasks.

A generalized "how to get started" on a certain task can be found under:

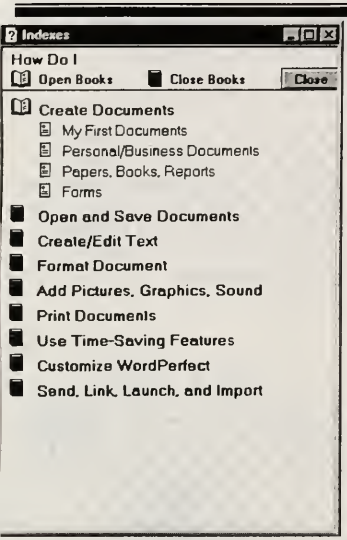


Figure 4: Create Documents

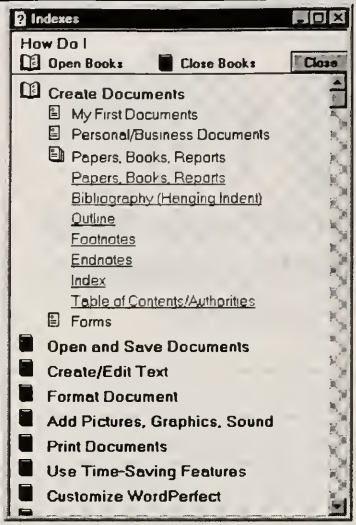


Figure 5: Papers, Books, Reports

Help,
How Do I...

This window brings up various tasks with a "closed" book next to them. Clicking on the closed book "opens" the selection and expands the topic to show you to related functions. See Figure 4.

If you are going to develop a report, click on the letter icon next to the words "Papers, Books, Reports" and this, in turn, opens up more related tasks. See Figure 5. In all WordPerfect Help Menus, if the selection is colored green, you can click right on the selection to open up the details about it.

You can then see all the functions WordPerfect has to offer for the type of report you want to develop.

So, no more waiting for answers that you have the ability to access on your own. It's simple and easy and best of all, it's fast! If you have questions on WordPerfect, check out the Online Help area. If you need assistance accessing the information, you can call (or ZIP!) Sue Skuletich (444-1392) from End User Systems Support.

SAS

Efficiency Coding in SAS

If you're trying to find a better way of coding repetitively generated SAS code, consider using SAS macro variables. For example, if you want to read ten files and create ten SAS data sets with the same layout you would have to write ten DATA steps.

```
Data sales80;
  infile file80;
  input month $ invoiced received
salesrep $;
run;
Data sales81;
  infile file81;
  input month $ invoiced received
salesrep $;
run;
Data sales82;
  infile file82;
  input month $ invoiced received
salesrep $;
run;
...
Data sales89;
  infile file89;
  input month $ invoiced received
salesrep $;
run;
```

You can use a macro variable to replace the pieces of the code that change. In this example, you want to replace the year indicator in the output SAS data set name and in the input File# fileref. To test the program, use a %LET statement to assign the macro variable a value.

```
%let year=80;
data sales&year;
  infile file&year;
  input month $ invoiced received
salesrep $;
run;
```

So that the code can be stored and used again, place the code in a macro. To define a macro, use a %MACRO statement to begin the macro and a %MEND statement to end the definition. To execute the macro, precede the macro name, DATAGEN in this example, with a percent sign.

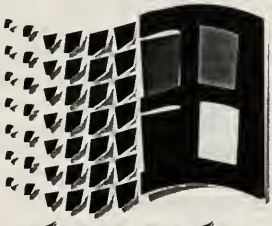
```
%macro datagen;
%let year=80;
data sales&year;
  infile file&year;
  input month $ invoiced received
salesrep $;
run;
%mend;
%datagen
```

Now we will add a Do-loop to the macro so that it will generate ten DATA steps instead of one.

```
%macro datagen;
%do year=80 %to 89;
data sales&year;
  infile file&year;
  input month $ invoiced received
salesrep $;
run;
%mend;
%datagen
```

You can use macros and macro variables to make it easy to maintain large production programs. For more information, see the SAS Guide to Macro Processing, Version 6, Second Edition.

For further assistance or questions, contact Jerry Kozak (444-2907) or Brian Divine (444-2791), both from End User Systems Support.



WINDOWS FREEBIES!

T-BUTTON

A Utility For Windows Users

T-BUTTON is a small utility intended for people who prefer to run their applications maximized (full screen), but would still like to have mouse access to the Task Manager. Following is an edited version of the TXT file that accompanies T-BUTTON.

T-BUTTON is a small window which stays on top of all other windows. It can be dragged to any point on the screen, but it always makes its first appearance in the lower right corner. Clicking on T-BUTTON will activate the Windows Task Manager, allowing you to switch between all active programs, without having to take your hand off the mouse (normally, you'd have to press **CTRL-ESCAPE** to activate Task Manager, or double click on your Windows desktop).
T-BUTTON uses few of your Windows resources and takes up very little memory.

T-BUTTON requires the file VBRUN300.DLL to be in your \WINDOWS\SYSTEM directory. To install T-BUTTON, place the files T-BUTTON.EXE and T-BUTTON.TXT in the directory of your choice. Next, with the Program Manager as the active window, open the program group you wish to place the T-BUTTON icon in. From Program Manager's menu, choose **File, New**. Type the full path to T-BUTTON. An example of this might be: C:\PROGRAMS\T-BUTTON.EXE. Or click the **Browse** button and use the Common Dialog to navigate to the directory containing T-BUTTON.EXE, highlight (click on) T-BUTTON.EXE in the files box, click **OK**, and click **OK** in the first dialog box.
T-BUTTON is now ready to run by double-clicking the T-BUTTON icon in Program Manager.

T-BUTTON has no menus or options after the introductory screen. To exit T-BUTTON, click on it to activate the Task Manager, highlight T-BUTTON in the task list, and click the button labeled **End Task**.

If you would like a copy of T-BUTTON, contact Denny Knapp (via ZIP!Mail or at 444-2072) from End User Systems Support.

Pssst... Listen Up!

MVS Tech Tips!

SDSF (System Display and Search Facility) PRINT Command

The SDSF PRINT command can be used to print job output, or the system log data, to an output data set. The output data set can be a JES SYSOUT data set, an existing data set, or a new data set.

If you specify **PRINT** with no additional parameters, this will open the default SYSOUT data set (JES spool, output class A), and the entire file will be printed to this SYSOUT data set. When the print data set is closed—**PRINT CLOSE**—the SYSOUT data set will be printed.

By specifying **PRINT OPEN**, you also have the option of specifying an output class, copies, and forms:

PRINT OPEN A 3 WHS3
Open a SYSOUT data set, class A, 3 copies, form WHS3

PRINT SYSOUT will display a panel for specifying attributes of the SYSOUT, including Class, Copies, Forms, Destination, FCB, UCS, Process Mode, Pagedef, Formdef.

PRINT SYSOUT

SDSF allows you to print to a new or existing data set. The data set organization must be sequential (PS) or partitioned (PO). When allocating to a data set for printing a SYSOUT file that does not contain printer carriage control, be sure the data set has an LRECL at least one byte greater than the SYSOUT's LRECL. SDSF PRINT commands generate ANSI control characters in output data sets of

line-mode data. If the DASD data set has an LRECL less than that of the SYSOUT data set, the data is truncated and no message is issued.

To print to a DASD data set,

PRINT ODSN dataset [vol-ser *or* ***] [disposition]**
- *dataset is the name of an existing or new data set*
- *vol-ser indicates the volume serial number to be used. * specifies no vol-ser will be used. Vol-ser or * is required if you specify a disposition.*
- *disposition is OLD, SHR, MOD or NEW. OLD is the default.*

PRINT DATASET (or **PRINT D**) will display a panel for specifying attributes of the data set.

Once you have opened a SYSOUT data set, via **PRINT OPEN** or **PRINT ODSN**, specify which lines you want to print:

PRINT first-line last-line
e.g., PRINT 25 30

PRINT
Print the entire file

If **PRT OPEN** was used, closing the SYSOUT data set makes it available for printing. If **PRINT ODSN** was used, closing the data set unallocates it. To close the print file, issue the command:

PRINT CLOSE

As an alternative to the **PRINT** command, you can use the **X** action character on panels that display data in a tabular format (the DA, H, I, O, or ST screen). The **X** action character has several forms:

X
Print. If a print file is not already open, open and print to a default SYSOUT data set.

XS
Display the panel for specifying attributes of the SYSOUT, then print to the data set.

XD
Display the panel for specifying attributes of a data set, then print to the data set.

XC, XSC, XDC
Close the SYSOUT or data set after printing to it. Closing the SYSOUT releases it for printing.

For more information on these MVS Tech Tips, please call Donna Cain (444-2879) from Operating System Support.

New Products and a Definition Of "Cache"

ComputerLand of Helena

New Product Announcements

IBM ThinkPad 760C/CD New Models Feature Higher Capacity Hard Disk Drives

Open the box of the new ThinkPad 760C or CD—see the extra-large 12.1-inch (measured diagonally) SVGA TFT display and the styling of the tilted keyboard with built-in palm rest— and you will realize that you are experiencing IBM's new generation of ThinkPad notebooks. Add to that a fast Pentium 120/60 MHz processor with L2 cache, larger-capacity hard disk storage of up to 1.2 GB (760CD only), media processor (Mwave Digital Signal Processor (DSP)), dual Infrared (IR) transceivers, 64 K color support, and highly functional ThinkPad Ultrabay—you have everything you need, and more, in a compact, lightweight notebook.

These new color models of the ThinkPad family emphasize faster performance and advanced function. Consider the ThinkPad 760CD system solution if you need more advanced and integrated multimedia capability—CD-ROM, audio, and video combined. The integrated removable CD-ROM drive (150/600 kbs), Total Image Video with MPEG-1 and MPEG-2 Half Horizontal Resolution (HHR) support, stereo speakers, theater sound (MIDI Wave Table Audio), and other features make the ThinkPad 760CD MPC-2 compliant, setting it apart from the rest of the ThinkPad family and much heavier and less integrated multimedia competitive systems.

A 760C or 760CD system, combined with any one of the four IBM docking solutions can easily become your primary personal computer, providing an alternative to a desktop system unit.

Features
- Higher capacity, removable hard disk drives: 1.08 GB (760C) or 1.2 GB (760CD)
- Pentium 120/60 MHz microprocessor (2.9 V) with internal L2 cache (120 MHz is the processor speed and 60 MHz is the speed at the bus)
- 12.1-inch (measured diagonally) SVGA TFT with SVGA (800 x 600) resolution. This is a bright Active Matrix display.

- Keyboard with automatic tilt function and palm-rest area
- Large memory capacity (8 MB to 40 MB)
- Option to add a second hard disk drive
- Media processor: Programmable Mwave DSP subsystem for audio, games, music; 28.8 Kbps data/fax modem; telephony (answering machine/speaker phone)
- On the 760CD: Total Image Video with MPEG-1 and MPEG-2 HHR support; Integrated removable 5.0-inch CD-ROM drive (4X)
- Li-Ion battery standard; capability to install two for much longer battery operation
- TrackPoint III
- Full complement of ports for peripheral connections
- Removable 1.44 MB floppy diskette drive
- Type III PCMCIA slot
- Power management
- Help Center service and support (800-772-2227)

The ThinkPad 760CD has the following additional features:

- Total Image Video with MPEG-1 and MPEG-2 HHR support. This includes enhanced video and stereo speakers, video-in and video-out (NTSL/PAL), video capture, hardware video acceleration, and scaling. MPEG (Moving Pictures Experts Group) is an industry standard for digital video compression.
- Integrated, removable 5.0-inch CD-ROM drive (4X)

IBM PC 300 166 MHz Models

Powered by the 166 MHz Pentium processor and featuring high-capacity 635 MB and 1.2 GB hard disks, the new PC 330 and PC 350 systems deliver exceptional speed and performance throughput, at a great price. New models include:

- 16 MB system memory standard
- 16 KB L2 cache standard
- 256 KB asynchronous L2 write-back cache on some models
- 256 KB pipeline burst L2 direct-mapped, write-back cache (133 MHz and 166 MHz)
- 635 MB or 1.2 GB hard disk, or 4X CD-ROM drive pre-installed with a 1.2 GB hard disk
- Leading industry technology designed for optimum performance, upgrade capability, compatibility, and investment protection
- System memory expandable to 128 MB
- Up to 4.8 GB hard disk capacity
- Enhanced IDE for support of up to four devices
- Local bus graphics controller
- Advanced Power Management (APM) and system asset management
- Choice of three-slot/three-bay or five-slot/five-bay design
- Vertical or horizontal orientation
- Front access PCMCIA support (with optional PCMCIA expansion card)
- Lockable DASD
- Three-year limited warranty for IBM's quality, reliability, service, and support
- Help Center service and support (800-772-2227)

Each PC 300 Pentium-based system provides high-speed, 64-bit PCI graphics performance, allowing you to take advantage of many popular, complex graphics applications. Additionally, powerful software tools—Easy Tools—help manage desktop computing assets with ease and effectiveness.

Dell Computer Corporation

OptiPlex

The Dell OptiPlex line experienced price drops of 10–27% during the month of January!

Dell is clearing out all existing component stock relevant to the 486 OptiPlex line of computers. Current prices begin under $1000 for a full featured bundle. Contact Scott Mangum (on the Internet at **scott_mangum@ccmail.us.dell.com** or 800/274-7799 ext. 66226) today for these exceptional prices.

Since the 90 MHz and 100 MHz are at price parity, Dell will discontinue manufacture of the 90 MHz models effective March 1.

Figure 6 compares the original Pentium OptiPlex line with the current "G" and "GX" series.

Dimension

Dell Dimension XPS Pro150 is now shipping with its "ramRIGHT" feature, a unique memory error correction system. Dell has also begun taking orders for the Dell Dimension XPS Pro200.

The "ramRIGHT" system is designed to detect and correct single-bit memory errors without interrupting normal system operations and for the first time without adding considerably to the price of the system. This extra protection is especially valuable for customers using complex, critical applications.

The "ramRIGHT" feature is available on Pentium Pro processor based Dell DimensionXPS systems ordered with Microsoft Windows NT Workstation or with Windows 95 and at least 32 MB of memory.

Notebooks

Dell's award winning Latitude Notebooks are continuing to lead the market in price, performance and availability! Prices have been slashed again on 486 and Pentiums alike.

If you are interested in discussing Dell's notebook roadmap, contact Mary Verdurmen (503/642-5383 or via the Internet at **mary_verdurmen @ccmail.us.dell.com**). Nondisclosures are available on our full line of products.

Internet

See us on the web at **http://www.dell.com**. A retail price configurator is now available on the web! Soon, you will see your own "State of Montana" configurator.

Category	OptiPlex X500	OptiPlex G500	OptiPlex G500
Product Description	Pentium based OptiPlex system offering PCI support, advanced PCI video, and support for up to 4 IDE devices including CD-ROMs	New entry level Pentium based OptiPlex system offering an extremely competitive price, standard Pentium performance and optional integrated networking	New Pentium based OptiPlex system offering PCI support, integrated video, pipeline burst cache and EDO memory
Target Market	Mainstream computer users who are focused on advanced technology, performance, security and support enhancing features for business critical applications	Price sensitive users who need a stable reliable platform. Focus on basic productivity applications in a networked environment	Mainstream computer users who are focused on advanced technology, performance, security and support enhancing features for business critical applications
Processors	P-75, 90, 100, 120 & 133	P-75, 90, 100, 120, 133, 150, 166	P-100, 120, 133, 650, 166
Memory	8 MB fast page standard 256 MB fast page maximum	8 MB EDO standard 128 MB EDO maximum	8 MB EDO standard 128 MB EDO maximum
Video Memory	1 MB standard, upgradeable to 2 MB	1 MB standard, upgradeable to 2 MB	2 MB standard
Standard Disk Interface	Enhanced IDE on the PCI bus—2 connectors supports up to 4 devices	Enhanced IDE on the PCI bus—2 connectors supports up to 4 devices	Enhanced IDE on the PCI bus—2 connectors supports up to 4 devices
Service	3 year limited warranty One year on-site Two years parts only	3 year limited warranty One year on-site Two years parts only	3 year limited warranty One year on-site Two years parts only

Figure 6: Original Pentium OptiPlex Line Compared With the Current "G" and "GX" Series

Prices are updated weekly. See you on the web!

Digital/MicroAge

Please contact Steve Woolley (442-0050 or 800/290-4743) at MicroAge for a quote or with any questions regarding Digital PCs.

Digital answers the question: *What is "cache"?*
When an application is running on a computer, the processor, or CPU is constantly receiving information from memory. This information provides the processor with the necessary data to perform its function.

Over the last several years, memory speeds have lagged behind increases in microprocessor speed. Processor speeds have increased over sixfold from 25 MHz to 166 MHz, while memory speeds have increased by less than 20 percent. This means that every access to a computer's main memory requires that the microprocessor wait, often without doing any other work.

Frequently, computer systems contain a hierarchy of storage devices. The hierarchy flows from faster to slower, and from smaller to larger. The faster the storage, the more expensive it is. The goal of a storage architecture design is to achieve the fastest possible architecture that is not prohibitively expensive.

Personal computer performance can be improved by supplying data to the processor fast enough that little or no waiting is required. This is done by gathering the data into a faster but more expensive area of memory called cache. Because of the expense, cache is used for a relatively small portion of the memory architecture. A typical amount is 256 KB to 512 KB (1 KiloByte = 1000 characters). This compares with 16 MB (16,000 KB) of main memory and more than 1 GB (1,000,000 KB) of disk storage often found in high-performance desktop systems.

One might think that such a small amount of fast cache memory would do little to improve performance. However, cache relies on the principle that operations in a computer program tend to execute the same portions of the program over and over again, and these portions are typically physically

close in memory.

Cache is divided into two types, cache contained internally to the processor, and external cache that is in a separate package. The Pentium processor has 16 KB (1 KiloByte = 1024 characters) of internal cache (8 KB for code and 8 KB for data). This cache can supply the processing unit with data as fast as the processor can use it. Approximately two-thirds of an application's data requests can be satisfied at this level.

Thanks to the locality of code and the repeating nature of many operations, it is possible to load the cache with most of the instructions and data needed to keep the processor operating. The effectiveness of cache depends a great deal upon the application being run. Up to 90 percent of the data and instruction needs for an application can be satisfied from a moderately sized cache.

Pentium PRO Q&A

(The following is an excerpt from **http://www.intel.com/procs/p6***)*

Q: What is the Pentium Pro processor?

The Pentium Pro processor family is the next generation of Intel's processor technology—especially designed to deliver the performance required for powerful 32-bit software. This includes demanding software like CAD, 3D, and multimedia authoring applications running on workstations and professional desktops, as well as large database and enterprise applications running on servers. While fast Pentium processors are the best choice for running today's PC software, the Pentium Pro processor's Dynamic Execution technology gives it the performance required for these more power-hungry applications. The Pentium Pro processor includes significant architectural innovations and enhancements, like Dynamic Execution. The result is a significant boost in system performance. Purchasers interested in optimal performance for demanding 32-bit applications should purchase an upgradable Pentium Pro processor based system.

Q: Is it compatible with previous Intel Architecture processors?

Yes. The Pentium Pro processor is fully compatible with all of your existing PC applications.

Q: Does software need to be recompiled to gain a performance enhancement on the Pentium Pro processor?

No. The Pentium Pro processor is designed to deliver optimal performance with 32-bit software. But you can also run the same software that you're using today and gain a performance boost. The Pentium Pro processor schedules instructions at run time dependent upon data availability. This means that the Pentium Pro processor performs well on any code designed to run on previous generation 32-bit Intel processors. The Pentium Pro processor will also execute 286-targeted code, but the performance gain will not be as high.

Q: How does the Pentium Pro processor achieve its performance?

Through a variety of architectural techniques such as Dynamic Execution and hardware features, such as the inclusion of the 256 K L2 cache in the package.

Q: Will an OverDrive Processor upgrade be available for the Pentium Pro processor?

Yes, Intel plans to offer a future OverDrive Processor upgrade for upgradable Pentium Pro processor based systems. This OverDrive Processor will be based on future processor technology and will take advantage of the performance headroom inherent in the Pentium Pro processor. This means that early system purchasers will have a path to future, even faster versions of Intel's newest processor through an OverDrive Processor upgrade.

ISD Information Services Division

Training Calendar

This schedule has been assembled by the Helena College of Technology of The University of Montana. If you have any questions about enrollment, please call 444-6821.

All classes will be held at the Helena College of Technology, Room 211, at 1115 N. Roberts, unless another location is specified. Please note that these costs are subject to change each July 1.

To enroll in a class, **you must send or deadhead an enrollment application** to the State Training Center, HCT, Helena, MT 59601. If you have questions about enrollment, please call 444-6821. *Once you enroll in a class, the full fee will be charged UNLESS you cancel at least three business days before the first day of class.* HCT is also willing to schedule specific classes by request from state agencies.

	DATES	COST	LENGTH
Data Network/Mainframe Classes			
Oracle	April 8, 9, 10	255.00	3
Oracle Forms	May 28, 29, 30	255.00	3
TSO/SPF	March 4,5 1:00 pm–4:30 pm, Room 210	85.00	1
Lotus Approach	April 22	85.00	1
Lotus Approach	May 7	85.00	1
Customized Novell Training	March 4, 5, 6, 7, 8	1000.00	5
Introduction to Novell	May 14, 15	170.00	2
Microcomputer Classes			
CorelDRAW!	April 16	85.00	1
Introduction to Windows	March 8	85.00	1
Introduction to Windows	March 18	85.00	1
Introduction to Windows	April 11	85.00	1
Introduction to Windows	May 3	85.00	1
Intermediate Windows Prereq. Intro. to Windows	April 15, 16	85.00	1
Fundamentals of DOS	April 4	85.00	1
PC Memory Management	April 5	85.00	1
Word Processing Classes			
WordPerfect 6.1 for Windows Prereq. Intro to Windows	March 19, 20	170.00	2
WordPerfect 6.1 for Windows Prereq. Intro to Windows	April 25, 26	170.00	2
WordPerfect 6.1 for Windows Prereq. Intro to Windows, WordPerfect	May 16, 17	170.00	2
WordPerfect 6.1 Conv. Windows Prereq. Intro. To Windows, WordPerfect	April 17	85.00	1
WordPerfect 6.1 Tables Prereq. WordPerfect 6.1 for Windows	April 23	42.50	½
WordPerfect 6.1 Merge & Sort Prereq. WordPerfect 6.1 for Windows	April 24	42.50	½
WordPerfect 6.1 Macros Prereq. WordPerfect 6.1 for Windows	May 21	42.50	1/2
Desktop Publishing With WordPerfect 6.1	April 1, 2	170.00	2
Spreadsheet Classes			
Lotus 1-2-3 for Windows	May 22, 23	170.00	2
Lotus 1-2-3 for Windows	March 21, 22	170.00	2
Lotus 1-2-3 Conversion to Windows	April 18	85.00	1

Prerequisites may be met with consent of Instructor.

The Helena College of Technology makes reasonable accommodations for any known disability that may interfere with a person's ability to participate in training. Persons needing an accommodation must notify the College no later than two weeks before the date of training to allow adequate time to make needed arrangements. To make your request known, call 444-6821.

ISD Class Enrollment Application

COMPLETE THIS APPLICATION **IN FULL** AND RETURN
IT **AT LEAST ONE WEEK PRIOR** TO THE FIRST DAY OF CLASS

COURSE DATA

Course Requested: _____

Date Offered: _____

STUDENT DATA

Name: _____

Soc. Sec. Number (for P/P/P): _____

Agency **&** **Division**: _____ / _____

Mailing Address: _____

_____

Phone: _____

How have you met the required prerequisites for this course? Explain, giving the class(es) taken, tutorial(s) completed, and/or experience.

_____

_____

_____

BILLING INFORMATION/AUTHORIZATION MANDATORY

User ID: _ _ _ _ _ _ Agency #: _ _ _ _

Authorized Signature: _____

FULL CLASS FEE WILL BE BILLED TO THE REGISTRANT UNLESS CANCELLATION IS MADE THREE BUSINESS DAYS BEFORE THE START DATE OF THE CLASS.

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OF THE UNIVERSITY OF MONTANA
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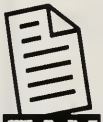

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Editor's Notes

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Editorial Submissions...

If you would like to submit an article to *ISD News & Views* for publication, please send it to Curt Secker or Irv Vavruska, preferably via ZIP!Mail. Please have your article in by the 15th of the month for inclusion in the following month's newsletter.

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Got a problem (opportunity)? Do you need ISD assistance for any of your information processing requirements? Then contact the ISD Customer Support Center (444-2000), which is our central point of contact.

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